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10/614,055	07/08/2003	Toshiyuki Okumura	Q74987	9769

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POSZ LAW GROUP, PLC
12040 SOUTH LAKES DRIVE
SUITE 101
RESTON, VA 20191

EXAMINER	
GARCIA, LUIS	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

3f

Office Action Summary	Application No.	Applicant(s)
	10/614,055	OKUMURA ET AL.
	Examiner	**Art Unit**
	Luis F. Garcia	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *July 8, 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-20,22-25* is/are rejected.

7)☒ Claim(s) *13 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *July 8, 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 17 is rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. "a host system said host system recurring information related to said optical switch from said optical switch" in which the definition of "recurring" is "to return"; therefore, a host system returning information related to said optical switch from said optical switch is indefinite. Not clear what part of the system the host is returning information to. Based on ¶0088 in SPEC, claim is hereinafter assumed to be "a host system said host system receiving information related to said optical switch…".

Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. "storing data acquired said operation of said optical switch", unclear what the limitation is stating in last part; is hereinafter assumed to be "storing data acquired from said operation of said optical switch"

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1, 3-12, 14-20 and 22-25 are rejected** under 35 U.S.C. 102(e) as being anticipated by Bhat et al (US 2002/0176648) hereinafter referred to as Bhat.

Claims 1,3-10 addressed below.

Regarding claim 11, Bhat discloses an optical switching subsystem comprising:

a plurality of input optical ports for inputting an optical signal **(FIG. 2 (I_1,I_2-input ports) and ¶0066)**;

a plurality of output optical ports for outputting the optical signal **(FIG. 2 (O_1,O_2-output ports) and ¶0066)**;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical ports **(FIG. 2 (MEMS: M_{R1},M_{R2},M_{S1},M_{S2}) and ¶0034,0063-0064, in which the optical switch is formed by MEMS and switches an optical path among input/output ports)**;

a controller for instructing said optical switch to execute switching operation **(FIG. 2 (300-PROCESSOR SYSTEM) and ¶0068-0069 in which the Processor System**

generates control output signals for instructing the optical switch to reposition (execute switching operation));

self-diagnosis means for measuring performance characteristics of said optical switching subsystem **(FIG. 2 (Sensor System, Processor System) and ¶0037,0045,0067 in which the sensor system (part of self-diagnosis means), measures the signal intensity (performance characteristic) and generates an error signal based on the signal intensity)** and diagnosing said optical switching subsystem based upon said performance characteristics **(FIG. 2 (Sensor System, Processor System) and ¶0044-0046 in which the processor system (part of self-diagnosis means) uses the sensor system's error signal (based on measured values) to diagnosis the optical switch (e.g. determines, via algorithm, how to minimize the error in which minimizing the error improves the signal transmission/signal intensity, (performance characteristic)))**; and

calibration means for calibrating control over the operation of said optical switch **(FIG. 2 (200-Sensor System, 300-Processor System, 340-Calibraiton Algorithm) and ¶0046 in which the calibration algorithm (part of calibration means) calibrates the position of the MEMS mirrors (control over the operation of said optical switch) for minimizing error in mirror alignment)**.

Regarding claim 12, Bhat discloses the optical switching subsystem according to Claim 11 as applied above.

Bhat further discloses wherein said calibration means comprises compensating means for calculating a controller output correction value **(FIG. 2 (340-Calibration**

Algorithm) and ¶0046 in which the Calibration Algorithm minimizes the error signal by compensating for parameter(s) (e.g. calculating a controller output correction value) which effects the optical signal transfer efficiency) and said self-diagnosis means operates based upon said controller output correction value **(FIG. 2 (300-Processor System) and ¶0046 in which the processor system uses (operates based on) the calibration algorithm (controller output correction value))**.

Regarding claim 14, Bhat discloses the optical switching subsystem according to claim 11 as applied above.

Bhat further discloses wherein the calibration means operates when the self-diagnosis means determines that a corresponding reflecting mirror of the optical switch fails based on measured performed characteristics **(FIG. 2 (300-Processor System, 340-Calibration Algorithm) and ¶0046 in which the Calibration Algorithm operates when the Processor System determines that the error (measured performance characteristic) in the optical switch has surpassed an allowable tolerance (failed based on measured performance characteristics))**.

Regarding claim 15, Bhat discloses the optical switching subsystem according to Claim 14 as applied above.

Bhat further discloses wherein the self-diagnosis means operates again after the calibration is executed by the calibration means **(FIG. 2 and ¶0046 in which the Processor System (e.g. includes calibration algorithm))**, and the self diagnosis means notifies a host system when it is diagnosed at that time that the corresponding reflecting mirror fails **(FIG. 2 (300-Processor System) and ¶0071-0072 in which the**

Processor System receives control signals from the remote communications line (host system) containing: updated control algorithms, calibration data, and other parameters which control a MEMS mirror set point; therefore, the Processor System inherently communicates with the host system, via remote communications link, about the system status (e.g. of a failed mirror). Reason being that calibration data, control algorithm and parameter updates serve the purpose of making the system more accurate in its MEMS mirror alignment; therefore, the host system needs feedback (notification) from the Processor System to know if certain values/tolerances should be updated).

Regarding claim 16, Bhat discloses an optical switching subsystem comprising:

a plurality of input optical ports for inputting an optical signal **(FIG. 2 (I_1,I_2-input ports) and ¶0066)**;

a plurality of output optical ports for outputting the optical signal **(FIG. 2 (O_1,O_2-output ports) and ¶0066)**;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical ports **(FIG. 2 (MEMS: M_{R1},M_{R2},M_{S1},M_{S2}) and ¶0034,0063-0064, in which the optical switch is formed by MEMS and switches an optical path among input/output ports)**;

a subsystem controller circuit for controlling said optical switching subsystem **(FIG. 2 (300-Processor System, 400-Position Driver) and ¶0068-0069 in which the Processor System (subsystem controller circuit) generates a control output**

signal for instructing (controlling) the Position Driver (optical switching subsystem) to reposition the MEMS mirrors);

a switching module controller circuit for controlling said optical switch **(FIG. 2 (400-Position Driver) and ¶0069-0070 in which the Position Driver (switching module controller circuit) controls the MEMS in the optical switch (said optical switch))**;

a memory connected to said subsystem controller and said switching module controller, for storing control parameters related to said optical switch **(FIG. 2 (350-Memory) and ¶0069 in which the Memory stores calibration parameters (control parameters) for the MEMS mirrors (optical switch) and connects to the Processor System (300) and the Position Driver (400) via output register (360))**;

a monitor for outputting a signal to the subsystem controller according to said output signal **(FIG. 2 (Sensor System) and ¶0037,0045,0067 in which the Sensor System (monitor) outputs a signal to the Processor System (subsystem controller) according to the measured intensity of the output signal)**.

Regarding in claim 17, rejected as stated in claim 15 in which the host system inherently receives information related to the optical switch from the Processor System).

Regarding claim 18, Bhat discloses the optical switching subsystem according to claim 16 as applied above.

Bhat further discloses comprising a ranking circuit for determining ranks of operation of switching elements **(FIG. 2 (Sensor System, Processor System) and ¶0039 in which the Sensor System (ranking circuit), manages (ranks) the signal**

intensities of new and previous measurements made in regard to the operation of the switching elements).

Regarding claim 19, Bhat discloses the optical switching subsystem according to claim 16 as applied above.

Bhat further discloses comprising a feedback control circuit for feedback controlling **(¶0025,0057 in which a feedback control circuit (e.g feedback system) is used)**.

Regarding claim 20, Bhat discloses the optical switching subsystem according to claim 19 as applied above.

Bhat further discloses wherein said feedback control circuit **(FIG. 2 and ¶0025 in which the feedback circuit includes Systems: 200,300,400)** includes said memory **(FIG. 2 (360-output buffer) in which an output buffer is functionally equivalent to memory (e.g stores values))**, a controlled object for outputting control output, a controller for outputting output of controller to said controlled object, **(FIG. 2 (200-Sensor System) in which the Sensor System (controller) outputs an error signal (control output) based on the intensity within the optical switch (controlled object))** and a comparator for comparing said control output with reference value from said memory **(FIG. 2 (320-Control Algorithm) and ¶0072 in which the Control Algorithm compares the Sensor System output (control output) with the output buffers values (e.g. current mirror position values)(reference value from said memory))**.

Regarding claim 22, Bhat discloses an optical switching subsystem self-diagnosing method comprising:

monitoring an intensity of an optical signal in an output optical port **(FIG. 2 (200-Sensor System) and ¶0037 in which the Sensor System monitors the intensity of the output port(s))**;

calculating a control voltage for controlling an optical switch according to at least said intensity of said optical signal **(FIG. 2 (300-Processor System) and ¶0068-0069 in which the Processor System processes (calculates) a control signal (e.g. voltage signal control signals) for controlling the position of the optical switch based on the error signal from the Sensor System (said intensity of said optical signal))**;

controlling a mirror of the optical switch **(FIG. 2 (300-Position Driver) and ¶0070 in which the Position Driver controls the mirrors of the optical switch)**;

determining ranks of operation of plural mirrors in said optical switch **(FIG. 2 (Sensor System) and ¶0055 in which the position (rank) of operation of the mirrors in optical switch is determined by the Sensor System)**.

Regarding claim 23, Bhat discloses the optical switching subsystem self-diagnosing method according to claim 22 as applied above.

Bhat further discloses comprising reading data for calculating said control voltage **(FIG. 2 (300-Processor System) and ¶0068-0069 in which the Processor System reads the input buffer data, from Sensor System-200, to generate (calculate) a control output (control voltage))** and storing data acquired said operation of said optical switch **(FIG. 2 (310-input buffers, 360-output buffers) in which the data read**

from the Sensor System is stored in input buffers (310) and the data generated (calculated) by the Processor System is stored in output buffers(360)).

Regarding claim 24, Bhat discloses the optical switching subsystem self-diagnosing method according to claim 22 as applied above.

Bhat further discloses notifying the host system of the information related to said ranks **(FIG. 2 (Processor System) and ¶0071-0072 in which the Processor System receives control signals from the remote communications line (host system) containing: updated control algorithms, calibration data, and other parameters which control a MEMS mirror set point; therefore, the Processor System inherently communicates with the host system, via remote communications link, about the status (rank) of the mirrors in the optical switch. Reason being that the calibration, control algorithm and parameter updates serve the purpose of making the system more accurate in its MEMS mirror alignment; therefore, the host system needs feedback (notification) from the Processor System to know if certain values/tolerances (ranks) should be updated).**

Regarding claim 25, Bhat discloses the optical switching subsystem self-diagnosing method according to claim 22 as applied above.

Bhat further discloses comprising compensating said control voltage **(FIG. 2 (220-compensator, 300-Processor System, 200-Sensor System) and ¶0069 in which the control output (voltage) from the Processor System is pre-compensated at the Sensor System (e.g. control output from Processor is based on the error signal output from the Sensor System which is compensated by**

compensator-220); therefore, pre-compensation at the Sensor System functionally equivalent to compensating at the Processor System).

Regarding claim 1, rejected as stated in claim 11 rejection.

Regarding claim 3, Bhat discloses the optical switching subsystem according to claim 1 as applied above.

Bhat further discloses wherein said performance characteristics are control input value for inputting to said optical switch or a state variable of said controller used for calculating said control input value **(FIG. 2 (Sensor System, Processor System) and ¶0044-0046 in which the processor system uses the Sensor System's error signal (based on measured performance characteristic(s)) to control the optical switch via a control signal (control input value)).**

Regarding claim 4, rejected as stated in claim 15 rejection.

Regarding claim 5, Bhat discloses the optical switching subsystem according to claim 1 as applied above.

Bhat further discloses wherein said self-diagnosis means ranks said performance characteristics **(FIG. 2 (Sensor System, Processor System) and ¶0039 in which the sensor system (part of self-diagnosis means), manages (ranks) the signal intensities (performance characteristic) of new and previous measurements)** and notifies a host system of ranking information **(FIG. 2 (Processor System) and ¶0071-0072 in which the Processor System receives control signals from the remote communications line (host system) containing: updated control algorithms, calibration data, and other parameters which control a MEMS mirror set point;**

therefore, the Processor System inherently communicates with the host system, via remote communications link, about the status (rank) of the mirrors in the optical switch. Reason being that the calibration, control algorithm and parameter updates serves the purpose of making the system more accurate in its MEMS mirror alignment; therefore, the host system needs feedback (notification) from the Processor System to know if certain values/tolerances (ranks) should be updated).

Regarding claim 6, Bhat discloses the optical switching subsystem according to claim 1 as applied above.

Bhat further discloses wherein said self-diagnosis means is operated without an instruction from a host system **(FIG. 2 and ¶0035, 0042 in which Sensor System, Processor system and the Position Driver are each localized system (e.g. each processes information without having to be instructed by the remote communications line (host system))**.

Regarding claim 7, rejected as stated in claim 15 rejection.

Regarding claim 8, rejected as stated in claim 12 rejection.

Regarding claim 9, rejected as stated in claim 13 rejection.

Regarding claim 10, Bhat discloses the optical switching subsystem according to claim 7 as applied above.

Bhat further discloses said calibration means is executed when the optical switching subsystem is activated **(FIG. 2 and ¶0046 in which calibration is executed periodically or whenever the error signal surpasses the error threshold (e.g. at**

start-up of the system the error passes the allowable threshold because none of the mirrors have been pre-aligned; thereby, starting calibration upon activation of the optical switching system)) and every predetermined time without an instruction from a host system **(¶0046 in which calibration is executed periodically (every predetermined time) and without an instruction from the remote commutations line (host system) (e.g. ¶0046: <u>self</u>-calibration program runs independent of the host system))**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **<u>Claim 2 is rejected</u>** under 35 U.S.C. 103(a) as being unpatentable over Bhat in view of Lofland et al (US 6,959,126); Lofland et al hereinafter referred to as Lofland.

<u>Regarding claim 2</u>, Bhat discloses the optical switching subsystem according to claim 1 as applied above.

Bhat does not expressly disclose wherein said performance characteristics are switching time of the optical path.

Lofland teaches wherein said performance characteristics are switching time of the optical path **(FIG. 11A,B and col3 ln12-15/col14 ln5-31 in which the Optical Switch Testing System measures switching time of all the optical paths in the switch)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Bhat and incorporate Lafland's teachings of measuring switching time in an optical switch. The motivation being that this enables the system to monitor switching time of all the ports in the system; thereby, allowing the system to identify failed or misaligned MEMS mirrors within the switch.

Allowable Subject Matter

5. **Claims 13 and 21 are objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER